

(19)



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11)

EP 0 865 800 A3

(12)

## EUROPEAN PATENT APPLICATION

(88) Date of publication A3:  
08.12.1999 Bulletin 1999/49

(51) Int Cl.<sup>6</sup>: A61N 1/05

(43) Date of publication A2:  
23.09.1998 Bulletin 1998/39

(21) Application number: 98301945.6

(22) Date of filing: 16.03.1998

(84) Designated Contracting States:  
AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC  
NL PT SE  
Designated Extension States:  
AL LT LV MK RO SI

• Camps, Antoine N.J.M.  
6287 NJ Eys (NL)  
• Van Der Kruk, Ron  
6241 CK Bunde (NL)

(30) Priority: 17.03.1997 US 820473

(71) Applicant: MEDTRONIC, INC.  
Minneapolis, Minnesota 55432 (US)

(74) Representative: Hughes, Andrea Michelle et al  
Frank B. Dehn & Co.,  
European Patent Attorneys,  
179 Queen Victoria Street  
London EC4V 4EL (GB)

(72) Inventors:  
• Woloszko, Jean  
San Diego, California 92130 (US)

### (54) Medical electrical lead

(57) A medical electrical lead for establishing an electrical connection with a tissue of the body, the lead having a lead body 6 and a semi-cylindrical cuff 15. In the preferred embodiment the semi-cylindrical cuff features one or more electrodes 10, 11, 12. The semi-cylindrical cuff having a long flap 16 which wraps about the cuff and a short flap 17 which wraps about the long flap. The semi-cylindrical cuff is relatively stiff as compared to the short flap. The short flap, in turn, is relatively the same stiffness as the long flap. The stiffness of each flap may be varied, however, so that one is more or less than the other, and in turn, than the cuff. Through such a multi-flap construction the electrodes may be positioned proximal to a nerve in such a manner that the mechanically induced damage may be minimized or even entirely eliminated. Finally, a method of implanting such an electrode is also disclosed.

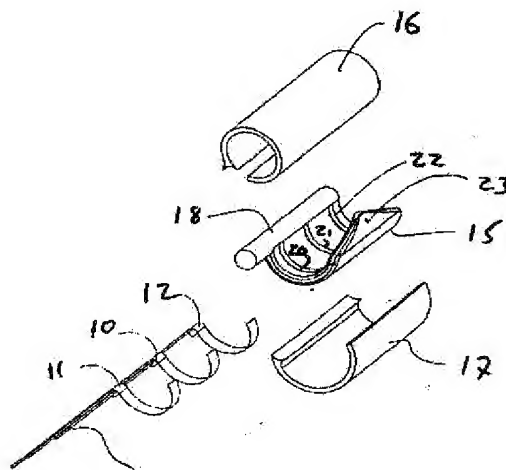


Fig 4A



European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 98 30 1945

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (InCLC)
A	US 5 487 756 A (KALLESOE KLAUS ET AL) 30 January 1996 (1996-01-30) * column 4, line 38 - column 9, line 4; figures *	1-9,14	A61N1/05
A	US 5 344 438 A (TESTERMAN ROY L ET AL) 6 September 1994 (1994-09-06) * column 3, line 4 - column 4, line 45; figures *	1,2,4,7, 14	
A	US 4 602 624 A (NAPLES GREGORY G ET AL) 29 July 1986 (1986-07-29) * column 2, line 41 - column 5, line 45; figures *	1-5,7,8	
A	US 4 590 946 A (LOEB GERALD E) 27 May 1986 (1986-05-27) * column 3, line 9 - column 4, line 68; figures *	1,2,14, 16	
A	EP 0 723 788 A (MEDTRONIC INC) 31 July 1996 (1996-07-31) * page 3, column 3, line 16 - page 4, column 5, line 29; figures *	1-4,6,7, 13	TECHNICAL FIELDS SEARCHED (InLCI,6) A61N
A	US 5 400 784 A (DURAND DOMINIQUE M ET AL) 28 March 1995 (1995-03-28) * column 2, line 53 - column 4, line 18; figures *	1-3,7,8	
A	US 5 273 053 A (POHNDORF PETER J) 28 December 1993 (1993-12-28) * figures *	1,2,14	
A	US 3 654 933 A (HAGFORS NORMAN R) 11 April 1972 (1972-04-11) * column 2, line 16 - column 4, line 35; figures *	1,2,14	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 18 October 1999	Examiner Rakotondrajaona, C
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons &amp; : member of the same patent family, corresponding document</p>			

EPO FORM 1503 (03.92) (P4C01)

ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.

EP 98 30 1945

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

18-10-1999

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5487756	A	30-01-1996	NONE	
US 5344438	A	06-09-1994	DE 4413065 A	27-10-1994
US 4602624	A	29-07-1986	NONE	
US 4590946	A	27-05-1986	NONE	
EP 0723788	A	31-07-1996	US 5741319 A	21-04-1998
			AU 694822 B	30-07-1998
			AU 4093296 A	08-08-1996
			CA 2168188 A	28-07-1996
			JP 8229139 A	10-09-1996
US 5400784	A	28-03-1995	AU 7978994 A	04-05-1995
			WO 9510227 A	20-04-1995
			US 5634462 A	03-06-1997
US 5273053	A	28-12-1993	AU 655373 B	15-12-1994
			AU 4873293 A	12-05-1994
			CA 2106332 A,C	03-05-1994
			DE 69324102 D	29-04-1999
			EP 0597213 A	18-05-1994
			JP 2523445 B	07-08-1996
			JP 6218066 A	09-08-1994
US 3654933	A	11-04-1972	DE 1955517 A	30-07-1970
			DK 131973 B	06-10-1975
			DK 132105 B	27-10-1975
			FR 2023549 A	21-08-1970
			FR 2023550 A	21-08-1970
			GB 1296550 A	15-11-1972
			GB 1298473 A	06-12-1972
			GB 1298474 A	06-12-1972
			JP 48036280 B	02-11-1973
			NL 6917338 A,B	20-05-1970
			SE 375909 B	05-05-1975
			SE 364872 B	11-03-1974

EPC FORM P/458

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82